SANYO

Service Manual

Stereo Synthesizer LW/MW/FM Tuner

JT 8500 (EUROPE) (SPAIN) (WEST GERMANY)

Specifications

Note:
The below mentioned specifications are mainly based on the IHF measurements standard. They can therefore not directly be compared with specifications based on the DIN standard or other standards.

FM section
Frequency range . . 87.5 – 108 MHz
Usable sensitivity. . 1.5 micro-V (mono)
Signal to noise ratio
(1 mV ANT). . . . 77 dB (mono)
Harmonic distortion
(1 kHz) . . . . . 0.3% (mono)
Frequency
response . . . . . 30 Hz – 15 kHz
(+1/-2 dB)
Stereo separation
(1 kHz) . . . . . 48 dB
Aerial input . . . . . 75 ohms unbalanced

AM (MW/LW) section
Frequency range . . MW: 522 – 1611 kHz
LW: 144 – 290 kHz
Sensitivity . . . . . MW: 500 micro-V/m,
LW: 1000 micro-V/m
Power requirements . . . . . AC: 220 V, 50 Hz
DC: 12 V, 100 mA
(from JA 8300 or JA 8500)
Dimensions
(W x D x H) . . . . Approx. 420 x 350 x 80 mm

Specifications subject to change without notice.

Note.
The power switch is mounted on the secondary side. The unit is not disconnected from AC-power, even when switched off.

PRODUCT CODE No.
129 324 00 (Europe)
129 324 01 (Spain)
129 324 02 (W. Germany)

Rechnungs-Nr.: 493733 / 003
Art.-Nr.: S M JT-8500
S M
Lagerort: KSO 15 AO 3
Menge : 1

REFERENCE No. WM-580220

PARTS LIST

PRODUCT SAFETY NOTICE

Each precaution in this manual should be followed during servicing. Components identified with the IEC symbol ⚠ in the parts list and the schematic diagram designate components in which safety can be of special significance. When replacing a component identified with ⚠, use only the replacement parts designated, or parts with the same ratings of resistance, wattage or voltage that are designated in the parts list in this manual.
Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returning the product to the customer.

CAUTION : Regular type resistors and capacitors are not listed. To know those values, refer to the schematic diagram.

PACKING & ACCESSORIES

Ref. No.	Part No.	Description
	614 211 9105	INNER CARTON (W.GERMANY)
	614 211 9099	INNER CARTON (SPAIN)
	614 208 4700	INNER CARTON (EUROPE)
	614 209 7311	PAD, RIGHT
	614 209 7328	PAD, LEFT
	614 176 8953	INNER POLYE LAMINA COVER, SET
	614 176 2685	INNER POLYE COVER, INST-M.
	614 176 1039	INNER POLYE COVER, STAND
	614 212 1474	INSTRUCTION MANUAL (W.GERMANY)
	614 212 1467	INSTRUCTION MANUAL (SPAIN)
	614 208 4724	INSTRUCTION MANUAL (EUROPE)
	614 186 2682	NOTICE, FTZ (W.GERMANY)
	614 036 8987	LOOP ANT ASSY, AM
	614 023 7344	ANT, FM
	614 022 2845	LEAD CORD, PIN TO PIN (RCA)
or	614 022 7604	LEAD CORD, PIN TO PIN (RCA)
or	614 022 9561	LEAD CORD, PIN TO PIN (RCA)
	614 106 3393	STAND, FELT, HIGHT CHANGE

CABINET & CHASSIS

Ref. No.	Part No.	Description
1	614 209 7090	ASSY, PANEL, FRONT
2	614 211 0188	ASSY, CABINET
3	614 208 3840	CABINET, BOTTOM
4	614 211 8979	PANEL, REAR (W.GERMANY)
or	614 211 8962	PANEL, REAR (SPAIN)
or	614 208 3888	PANEL, REAR (EUROPE)
5	614 208 3949	BUTTON, TUNING
6	614 208 5134	BUTTON, BAND
7	614 208 7640	BUTTON, MODE
8	614 207 3445	BUTTON, POWER
9	614 208 3970	BUTTON, PRESET
10	614 208 3963	BUTTON, CLOCK SET
11	614 210 3968	ASSY, FOOT, FRONT
12	614 210 3975	ASSY, FOOT, REAR
13	⚠ 614 129 1901	FIXER, AC CORD
14	614 108 0307	BRACKET, LOOP ANT.
15	614 117 9988	REFLECTOR, LED
16	614 084 9790	SIGN WINDOW, LED
17	614 195 4974	BRACKET, PCB STAND

FIXING PARTS

Ref. No.	Part No.	Description
Y1	412 004 2902	SPECIAL SCREW
Y2	411 021 6405	SCR S-TPG BIN 3X8
Y3	411 021 6603	SCR S-TPG BIN 3X8
Y4	411 022 2802	SCR S-TPG FLT 3X10
Y5	411 020 9902	SCR S-TPG BRZ + FLG 3X8
Y6	411 092 5901	WASHER Z3

ELECTRICAL PARTS

Ref. No.	Part No.	Description
51	⚠ 614 023 3100	POWER CORD
or	⚠ 614 203 0493	POWER CORD
52	⚠ 614 209 6628	POWER TRANS, PT901

TUNER MAIN P.C.BOARD ASSY

Ref. No.	Part No.	Description
71	614 212 9784	ASSY, PCB, TUNER MAIN (W.GERMANY)
	614 209 6352	ASSY, PCB, TUNER MAIN (EUROPE·SPAIN)
	614 209 6635	LIQUID CRYSTAL DISPLAY (LCD), A401
	614 117 2675	SHIELD PLATE, PARTS SIDE
	614 116 7787	SHIELD PLATE, SOLDER SIDE
	614 195 8422	TERMINAL, JK1, ANT.
CT101	614 007 3683	TRIMMER, 8P, BK
CT102	614 007 3683	TRIMMER, 8P, BK
CT104	614 007 3683	TRIMMER, 8P, BK
CT151	614 007 6349	TRIMMER, 11P, WH
or	614 007 6356	TRIMMER, 11P, WH
CT152	614 007 6349	TRIMMER, 11P, WH
or	614 007 6356	TRIMMER, 11P, WH
CT153	614 007 6325	TRIMMER, 30P, GR
or	614 007 6332	TRIMMER, 30P, GR
CT154	614 007 6325	TRIMMER, 30P, GR
or	614 007 6332	TRIMMER, 30P, GR
CT401	614 007 8800	TRIMMER, 10P, BL
or	614 007 8817	TRIMMER, 10P, BL
T101	614 028 6922	FILTER (W.GERMANY)
T201	614 030 3476	IFT
T202	614 211 9396	TRANS, IF
T203	614 030 4480	IFT
T204	614 211 9402	TRANS, IF
T205	614 029 3906	MX COIL (W.GERMANY)
L101	614 035 1101	VHF COIL
L102	614 035 1118	VHF COIL
L103	614 028 4058	FILTER
L104	614 035 0036	VHF COIL
L105	614 034 8286	VHF COIL (W.GERMANY)
L106	614 035 1125	VHF COIL
L151	614 033 8898	OSC COIL
L152	614 032 8066	ANT COIL
L153	614 034 1003	OSC COIL
L154	614 032 8080	ANT COIL
L155	614 028 4379	FILTER
LPF301	614 028 6915	FILTER
LPF302	614 028 6915	FILTER
X201	614 030 5814	IF FILTER
X202	614 030 5814	IF FILTER
X203	614 030 5814	IF FILTER
X204	614 030 7443	IF FILTER
X205	614 030 7399	IF FILTER
X301	614 211 4032	RESONATOR
X401	614 204 0317	CRYSTAL
SVR201	614 002 9932	SEMI-FIXED VR, 20K OHM (B)
or	614 006 9693	SEMI-FIXED VR, 20K OHM (B)
SVR202	614 002 9925	SEMI-FIXED VR, 10K OHM (B)
or	614 006 9686	SEMI-FIXED VR, 10K OHM (B)

PARTS LIST

Ref. No.	Part No.	Description
SVR301	614 002 9956	SEMI-FIXED VR, 100K OHM (B)
or	614 006 9716	SEMI-FIXED VR, 100K OHM (B)
CN401	614 020 6548	SOCKET, 2P, LCD LAMP
CN402	614 035 4997	SOCKET, 10P, PRESET SW
CN403	614 035 4980	SOCKET, 9P, MODE SW
CN901	614 020 6548	SOCKET, 2P, P.T CONNECT
CN902	614 035 4928	SOCKET, 3P, DC REGULATOR
CN903	614 035 4928	SOCKET, 3P, POWER SW
P1	614 016 8235	PLUG, 4P, SYSTEM REMOTE
P2	614 020 2106	SOCKET, 2P, JK2, OUTPUT
TP101	614 017 7961	TERMINAL BOARD, 1P, WRAPPING PIN
TP201	614 017 7961	TERMINAL BOARD, 1P, WRAPPING PIN
TP202	614 017 7961	TERMINAL BOARD, 1P, WRAPPING PIN
TP203	614 017 7961	TERMINAL BOARD, 1P, WRAPPING PIN
TP402	614 017 7961	TERMINAL BOARD, 1P, WRAPPING PIN
IC201	409 016 2204	IC LA1265S
IC301	409 017 1008	IC LA3401
IC401	410 032 2208	IC TC9306F-018
IC402	409 154 0209	IC TC9172AP
Q101	405 028 5202	TR 3SK73-GR
Q102	405 016 5900	TR 2SC2999-E-SPA
Q103	405 075 6009	TR 2SC930-E-CONV
Q104	405 016 5900	TR 2SC2999-E-SPA
Q105	405 026 8700	TR 2SK212-F-SPA
Q151	405 021 0600	TR 2SD1012-G-SPA
Q152	405 021 0600	TR 2SD1012-G-SPA
Q153	405 021 0600	TR 2SD1012-G-SPA
Q154	405 021 0600	TR 2SD1012-G-SPA
Q155	405 021 0600	TR 2SD1012-G-SPA
Q156	405 026 9004	TR 2SK222-D
Q157	405 017 9709	TR 2SC3330-U
Q158	405 017 9709	TR 2SC3330-U
Q201	405 037 4104	TR 2SC930-E-IF-SPA
Q301	405 021 0600	TR 2SD1012-G-SPA
Q302	405 021 0600	TR 2SD1012-G-SPA
Q351	405 004 4601	TR 2SA608-F-SPA
Q352	405 017 9709	TR 2SC3330-U
Q355	405 004 4601	TR 2SA608-F-SPA
Q356	405 004 4601	TR 2SA608-F-SPA
Q357	405 018 2600	TR 2SC3400
Q358	405 004 4601	TR 2SA608-F-SPA
Q359	405 018 2600	TR 2SC3400
Q360	405 004 4601	TR 2SA608-F-SPA
Q401	405 018 0101	TR 2SC3331-T
Q402	405 026 9004	TR 2SK222-D
Q403	405 010 9607	TR 2SC1571-F-NP
Q404	405 004 4601	TR 2SA608-F-SPA
Q405	405 017 9709	TR 2SC3330-U
Q406	405 004 4601	TR 2SA608-F-SPA
Q407	405 018 0101	TR 2SC3331-T
Q408	405 018 2600	TR 2SC3400
Q409	405 003 7702	TR 2SA1346
Q410	405 018 2600	TR 2SC3400
Q901	405 004 4601	TR 2SA608-F-SPA
Q902	405 018 0101	TR 2SC3331-T
D101	408 000 0103	VA SVC211SP-B2-AUD
D102	408 000 0103	VA SVC211SP-B2-AUD
D103	408 000 0103	VA SVC211SP-B2-AUD
D104	407 007 9904	DIODE GMA01
D105	408 000 0103	VA SVC211SP-B2-AUD
D151	407 000 1905	VARACTOR DI KV1260(B)
D201	407 007 9904	DIODE GMA01
D301	407 005 4505	DIODE DS442X
D302	407 005 4505	DIODE DS442X
D303	407 007 9904	DIODE GMA01
D304	407 005 4505	DIODE DS442X
D351	407 005 4505	DIODE DS442X
D352	407 005 4505	DIODE DS442X
D353	407 005 4505	DIODE DS442X
D401	407 005 4505	DIODE DS442X
D402	407 005 4505	DIODE DS442X
D403	407 005 4505	DIODE DS442X
D404	407 007 9904	DIODE GMA01
D405	407 005 4505	DIODE DS442X
D406	407 005 4505	DIODE DS442X
D407	407 005 4505	DIODE DS442X
D408	407 007 9904	DIODE GMA01
D409	407 005 4505	DIODE DS442X
D410	407 005 4505	DIODE DS442X
D412	407 005 4505	DIODE DS442X
D413	407 005 4505	DIODE DS442X
D414	407 005 4505	DIODE DS442X
D415	407 005 4505	DIODE DS442X
D416	407 007 9904	DIODE GMA01
D417	407 007 9904	DIODE GMA01
D422	407 053 7206	ZENER DIODE MTZ6.2C
D901	407 005 4505	DIODE DS442X
D902	407 005 4505	DIODE DS442X
D951	⚠ 407 004 9006	DIODE DSF10B
D952	⚠ 407 004 9006	DIODE DSF10B
D953	⚠ 407 004 9006	DIODE DSF10B
D954	⚠ 407 004 9006	DIODE DSF10B
D955	⚠ 407 004 9006	DIODE DSF10B
D956	⚠ 407 004 9006	DIODE DSF10B
C407	403 106 1603	NP-ELECT 1U Q 50V
C410	404 034 8405	CAPACITOR 0.047F Z 5.5V
R301	⚠ 401 149 2007	CARBON 56 JB 1/2W
R343	⚠ 401 149 2007	CARBON 56 JB 1/2W
R961	⚠ 401 149 2007	CARBON 56 JB 1/2W

PRESET SWITCH P.C.BOARD ASSY

Ref. No.	Part No.	Description
72	614 209 6376	ASSY, PCB, PRESET･UP/ DOWN･BAND SW
S406	614 018 9056	SWITCH, DOWN
S407	614 018 9056	SWITCH, UP
S408	614 018 9056	SWITCH, PRESET 1
S409	614 018 9056	SWITCH, PRESET 2
S410	614 018 9056	SWITCH, PRESET 3
S411	614 018 9056	SWITCH, PRESET 4
S412	614 018 9056	SWITCH, PRESET 5
S413	614 018 9056	SWITCH, PRESET 6
S414	614 018 9056	SWITCH, BAND
CN402	614 035 4997	SOCKET, 10P, MAIN
D420	407 007 9904	DIODE GMA01
D421	407 007 9904	DIODE GMA01

MODE SWITCH P.C.BOARD ASSY

Ref. No.	Part No.	Description
73	614 209 6390	ASSY, PCB, MODE･CLOCK ADJ.･+･-･H/M SW
S401	614 018 9056	SWITCH, CLOCK ADJ.
S402	614 018 9056	SWITCH, HOUR/MINUTE
S403	614 018 9056	SWITCH, -
S404	614 018 9056	SWITCH, +
S405	614 018 9056	SWITCH, MODE
CN403	614 035 4980	SOCKET, 9P, MAIN
D418	407 007 9904	DIODE GMA01
D419	407 007 9904	DIODE GMA01

PARTS LIST

LCD LAMP P.C.BOARD ASSY

Ref. No.	Part No.	Description
74	614 209 6413	ASSY, PCB, LCD LAMP
CN401	614 020 6548	SOCKET, 2P, MAIN
PL901	614 045 9647	LAMP, 12V 100MA

DC REGULATOR P.C.BOARD ASSY

Ref. No.	Part No.	Description
75	614 209 6420	ASSY, PCB, DC REGULATOR
CN902	614 035 4928	SOCKET, 3P, MAIN
IC901	409 122 6202	IC NJM7812FA

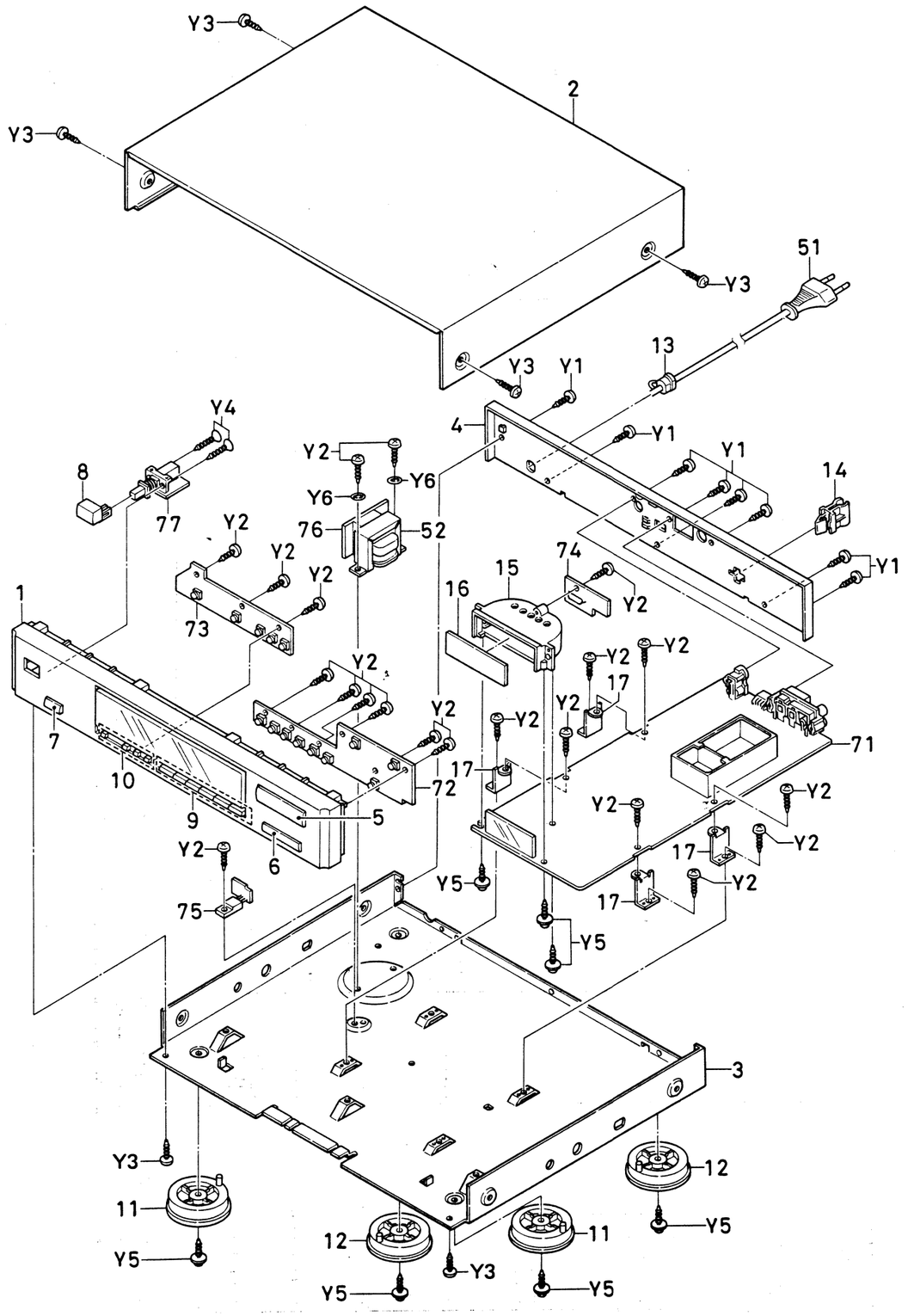
P.T CONNECT P.C.BOARD ASSY

Ref. No.	Part No.	Description
76	614 209 6444	ASSY, PCB, P.T CONNECT
	⚠ 614 123 2089	TERMINAL, AC-IN
CN901	614 020 6548	SOCKET, 2P, MAIN

POWER SWITCH P.C.BOARD ASSY

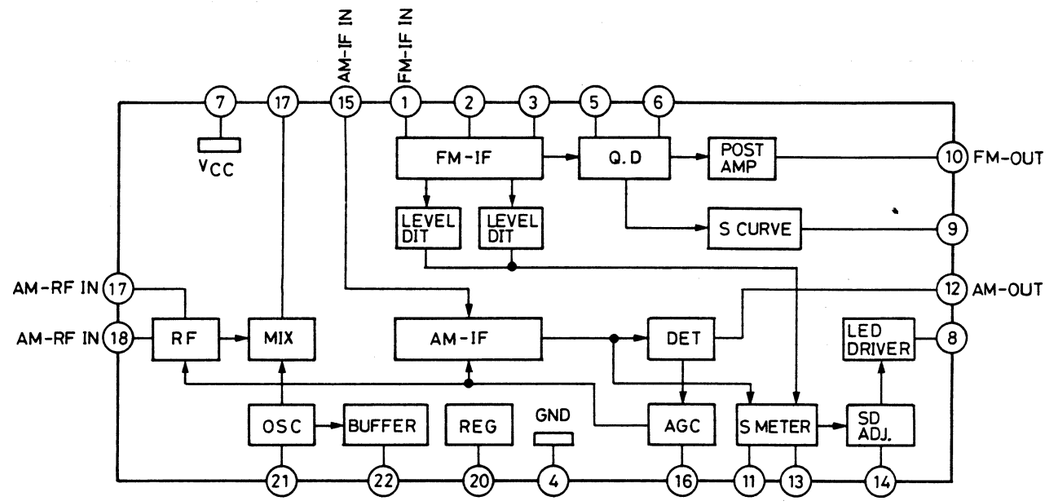
Ref. No.	Part No.	Description
77	614 209 6451	ASSY, PCB, POWER SW
S901	614 019 0663	SWITCH, POWER
CN903	614 035 4928	SOCKET, 3P, MAIN

EXPLODED VIEW

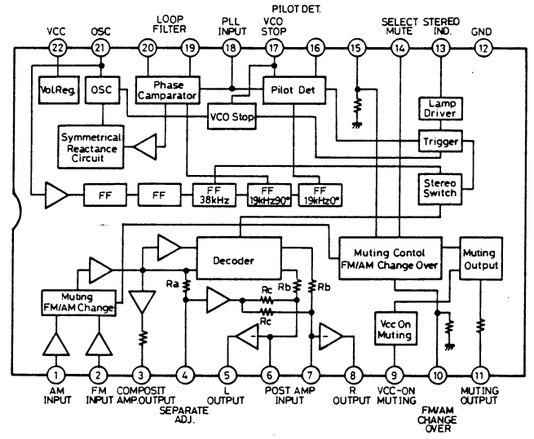


IC BLOCK DIAGRAM

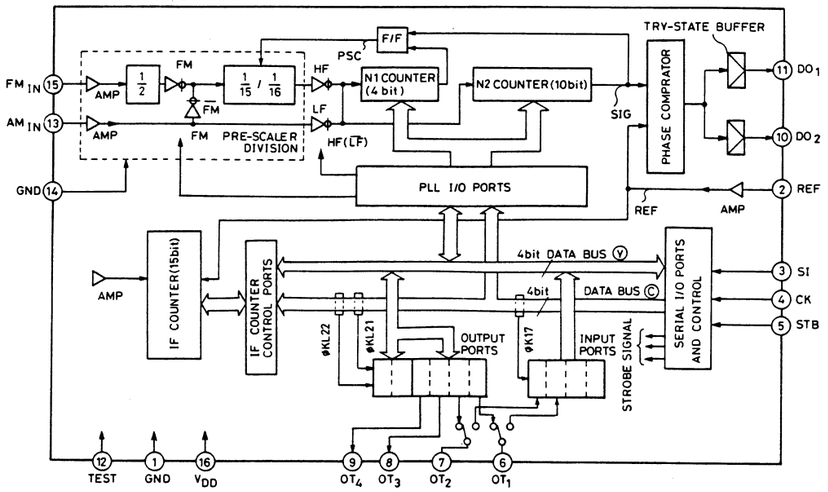
IC201 LA1265 (Tuner System)

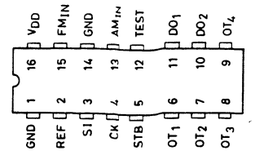


IC301 LA3401 (PLL FM MPX Stereo Dmeodulator)



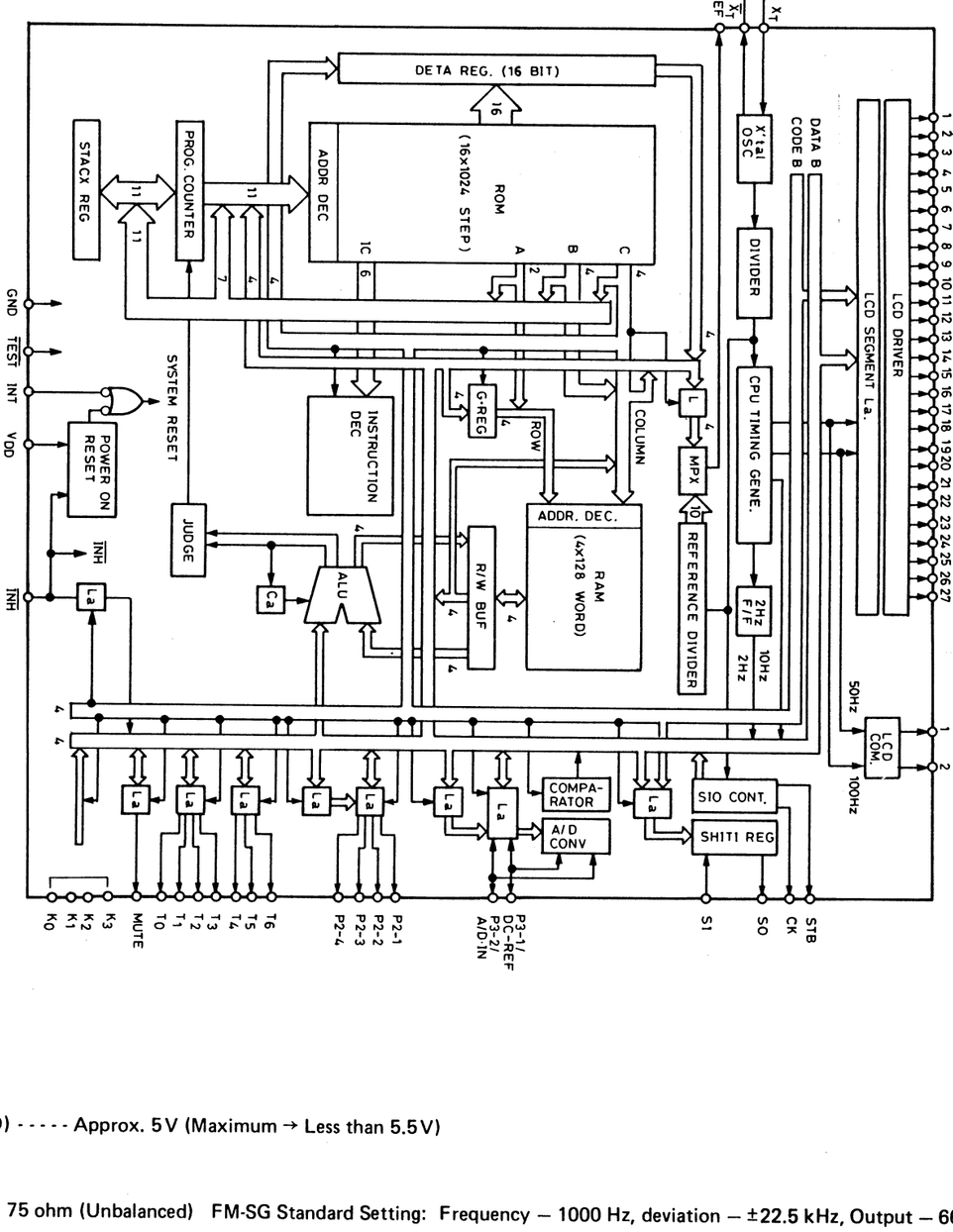
IC402 TC9172AP (High-Speed PLL with Pre-Scaler)





IC BLOCK DIAGRAM

IC401 TC9306F (Digital Tuning System with LCD Driver)



(1) VOLTAGE CHECK IC401 PIN 53 ~ Earth (GND) - - - - - Approx. 5V (Maximum → Less than 5.5V)
POWER SOURCE AC 220V

(2) FM BAND

- Set BAND switch in the FM position. ANT: 75 ohm (Unbalanced) FM-SG Standard Setting: Frequency – 1000 Hz, deviation – ±22.5 kHz, Output – 66 dB

ITEM (ADJUSTING CIRCUIT)		INPUT CONDITION				OUTPUT CONDITION		FREQUENCY OF UNIT	ADJUSTING POINT	ADJUSTING PROCEDURE
		MEASURING INSTRUMENT	CONNECTION POINT	FRE-QUENCY	INPUT VALUE	MEASURING INSTRUMENT	CONNECTION POINT			
Clock (Time Error)						Frequency Counter	TP101 (H) TP102 (E)	87.5 MHz	CT401	• Adjust so that the counter indication becomes 98.2 ± 0.5 KHz.
Intermediate Frequency (IF)	V Curve	FM-Sweep Generator	TP103 (H) TP102 (E)	10.7 MHz		FM-Sweep Generator	TP207 (H) TP102 (E)		T201	• Match to the frequency of ceramic filter. • Adjust so that the symmetrical wave form becomes the maximum.
	S Curve						TP204 (H) TP102 (E)		T202, T204	
Covering Frequency	High					Digital Voltmeter	TP402 (H) TP102 (E)	108.0 MHz (Hi-end)	L104	• Adjust so that the digital voltmeter indication becomes 8.0 ± 0.05V.
	Low							87.5 MHz (Low-end)		• Confirm so that the digital voltmeter indication becomes 1.3 ~ 1.5V.
Tracking Frequency	Low	FM-SG	TP103 (H) TP102 (E)	90 MHz	8 dB environs	Oscilloscope VTVM Distortion Meter	Tuner Out	90 MHz	L101,L102 L106	• Adjust so that the output value becames the maximum.
	High			106 MHz				106 MHz	CT101,CT102 CT104	
IF (Distortion Factor)		FM-SG	TP103 (H) TP102 (E)	98.0 MHz	66 dB	Digital Voltmeter	TP201 (H) TP202 (E)	98.0 MHz	T202	• Adjust so that the digital voltmeter indication becomes 0.0 ± 0.05V.
									T204	• Adjust so that the distortion meter indication becames the mimimum.
SD (Auto Stop Sencitivity)		FM-SG	TP103 (H) TP102 (E)	98.0 MHz	26 dB	Digital Voltmeter	TP203 (H) TP102 (E)	98.0 MHz	SVR201	• Adjust so that the digital voltmeter indication becomes less than 4V.
Separation		FM-SG STEREO –MEDULA-TOR	TP103 (H) TP102 (E)	98.0 MHz	66 dB	Oscilloscope VTVM	Tuner Out	98.0 MHz	SVR301	• Adjust so that the leakage currents of the right and left channels are minimized in good balance.

FM-STEREO MODULATOR Setting: Main ± 40 kHz dev. Pilot ± 6.75 kHz dev.

Note:
- To adjust V curve of FM-IF, remove the soldered part (positive side of C215 and pin 13 of IC201) on the pattern. After adjusting, solder again.
- As TP202 does not have earth potential, do not short-circuit to the chassis.
- When executing adjustment, be sure to set the mode switch to AUTO STEREO.

(3) MW BAND

- Set BAND switch in the MW position. ANT: IRE Loop AM-SG Standard Setting: Frequency – 1000 Hz, modulation – 30%

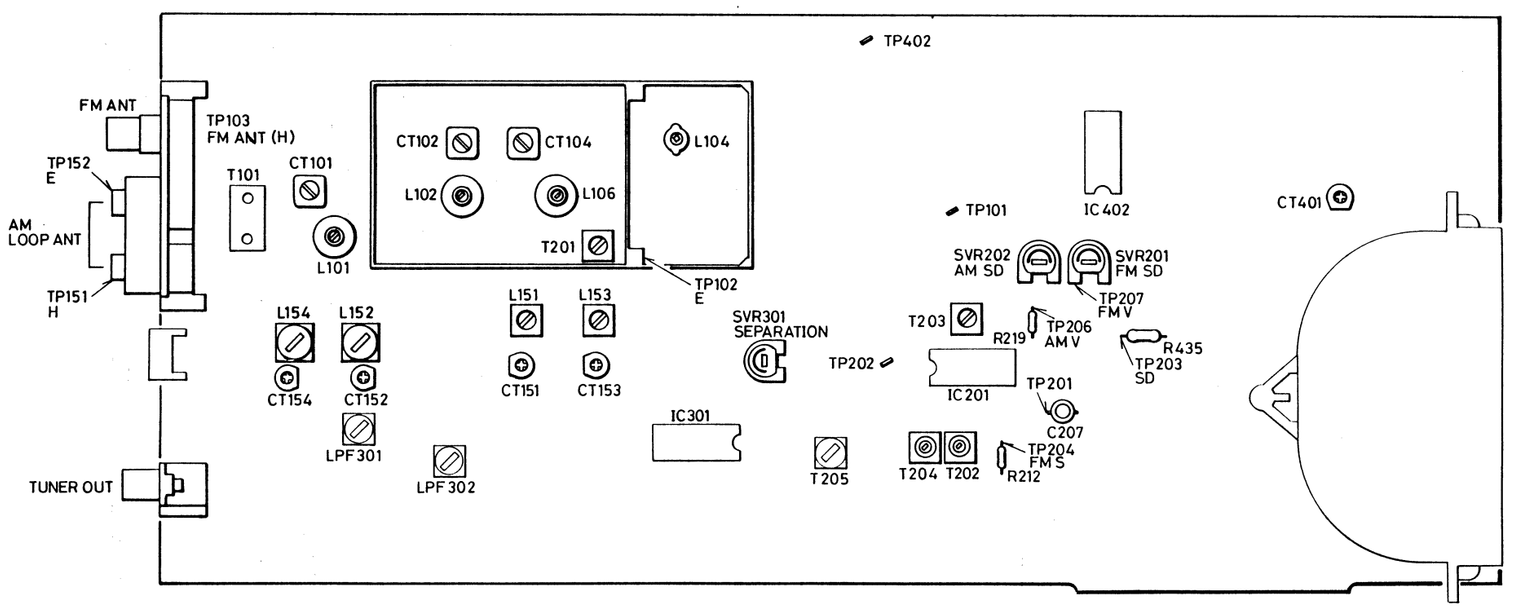
ITEM (ADJUSTING CIRCUIT)		INPUT CONDITION				OUTPUT CONDITION		FREQUENCY OF UNIT	ADJUSTING POINT	ADJUSTING PROCEDURE
		MEASURING INSTRUMENT	CONNECTION POINT	FRE-QUENCY	INPUT VALUE	MEASURING INSTRUMENT	CONNECTION POINT			
Intermediate Frequency (IF)		AM-Sweep Generator	TP151 (H) TP152 (E)	459 kHz	Small	AM-Sweep Generator	TP206 (H) TP102 (E)		T203	• Match to the frequency of ceramic filter. • Adjust so that the symmetric wave form becames the maximum.
Covering Frequency	Low					Digital Voltmeter	TP402 (H) TP102 (E)	522 kHz	L151	• Adjust so that the digital voltmeter indication becames 1.3 ± 0.03V.
	High							1611 kHz	CT151	• Adjust so that the digital voltmeter indication becomes 8.0 ± 0.05V.
Tracking Frequency	Low	AM-SG	Loop Ant.	603 kHz	75 dB	Oscilloscope VTVM Distortion Meter	Tuner Out	603 kHz	L152	• Adjust so that the output value becomes the maximum.
	High			1404 kHz				1404 kHz	CT152	
SD (Auto Stop Sensitivity)		AM-SG	Loop Ant.	999 kHz	86 dB	Digital Voltmeter	TP203 (H) TP102 (E)	999 kHz	SVR202	• Adjust so that the digital voltmeter indication becomes less than 4V.

Note: • Execute SD adjustment after completion of FM-SD adjustment.

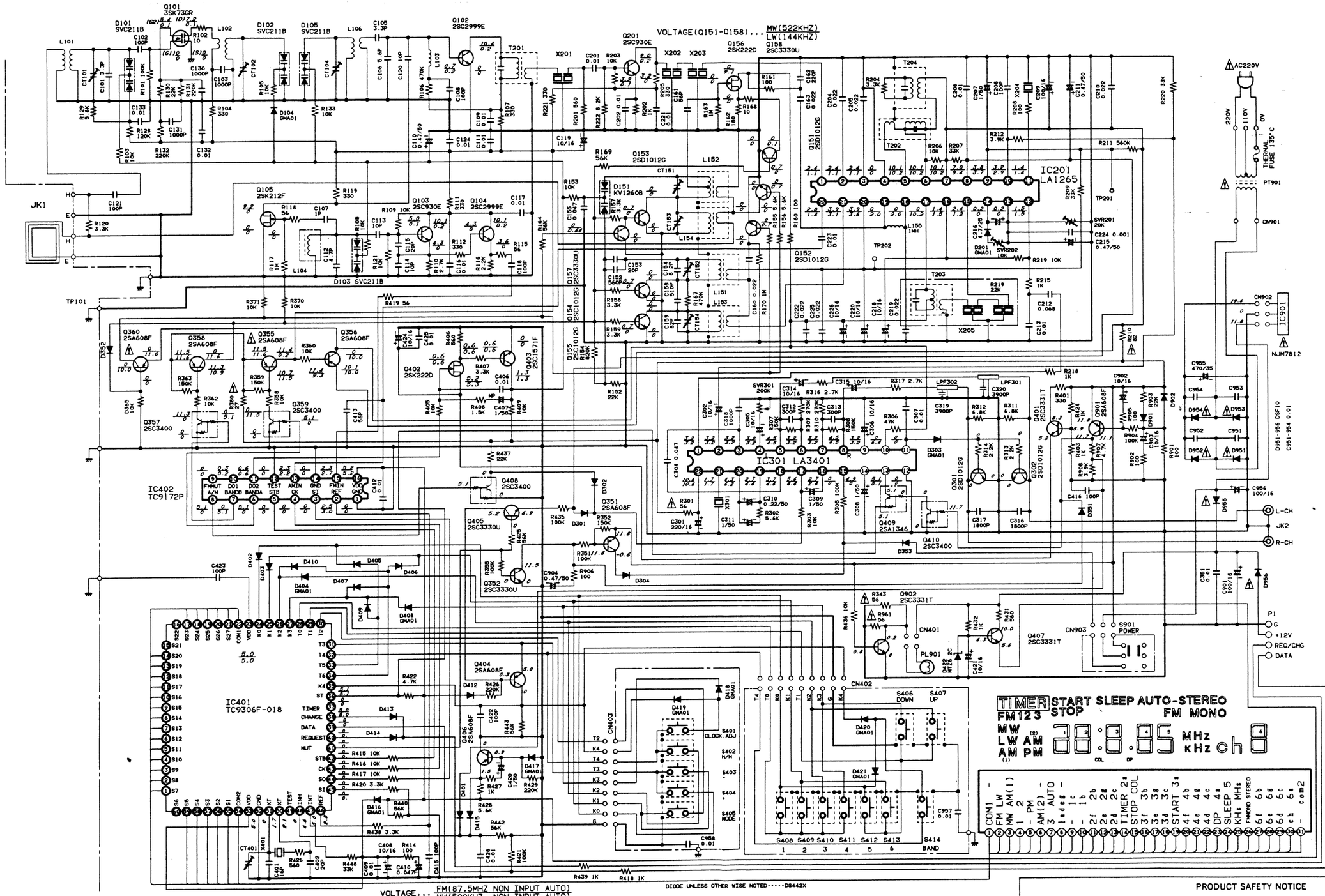
(4) LW BAND

- Set BAND switch in the LW position. ANT: IRE Loop AM-SG Standard Setting: Frequency – 400 Hz, modulation – 30%

ITEM (ADJUSTING CIRCUIT)		INPUT CONDITION				OUTPUT CONDITION		FREQUENCY OF UNIT	ADJUSTING POINT	ADJUSTING PROCEDURE
		MEASURING INSTRUMENT	CONNECTION POINT	FRE-QUENCY	INPUT VALUE	MEASURING INSTRUMENT	CONNECTION POINT			
Covering Frequency	Low					Digital Voltmeter	TP402 (H) TP102 (E)	144 kHz	L153	• Adjust so that the digital voltmeter indication becomes 1.6 ± 0.03V.
	High							290 kHz	CT153	• Adjust so that the digital voltmeter indication becomes 7.0 ± 0.1V.
Tracking Frequency	Low	AM-SG	Loop Ant.	162 kHz	83 dB	Oscilloscope VTVM Distortion Meter	Tuner Out	162 kHz	L154	• Adjust so that the output value becames the maximum.
	High			279 kHz				279 kHz	CT154	



SCHEMATIC DIAGRAM — (FOR EUROPE · SPAIN)



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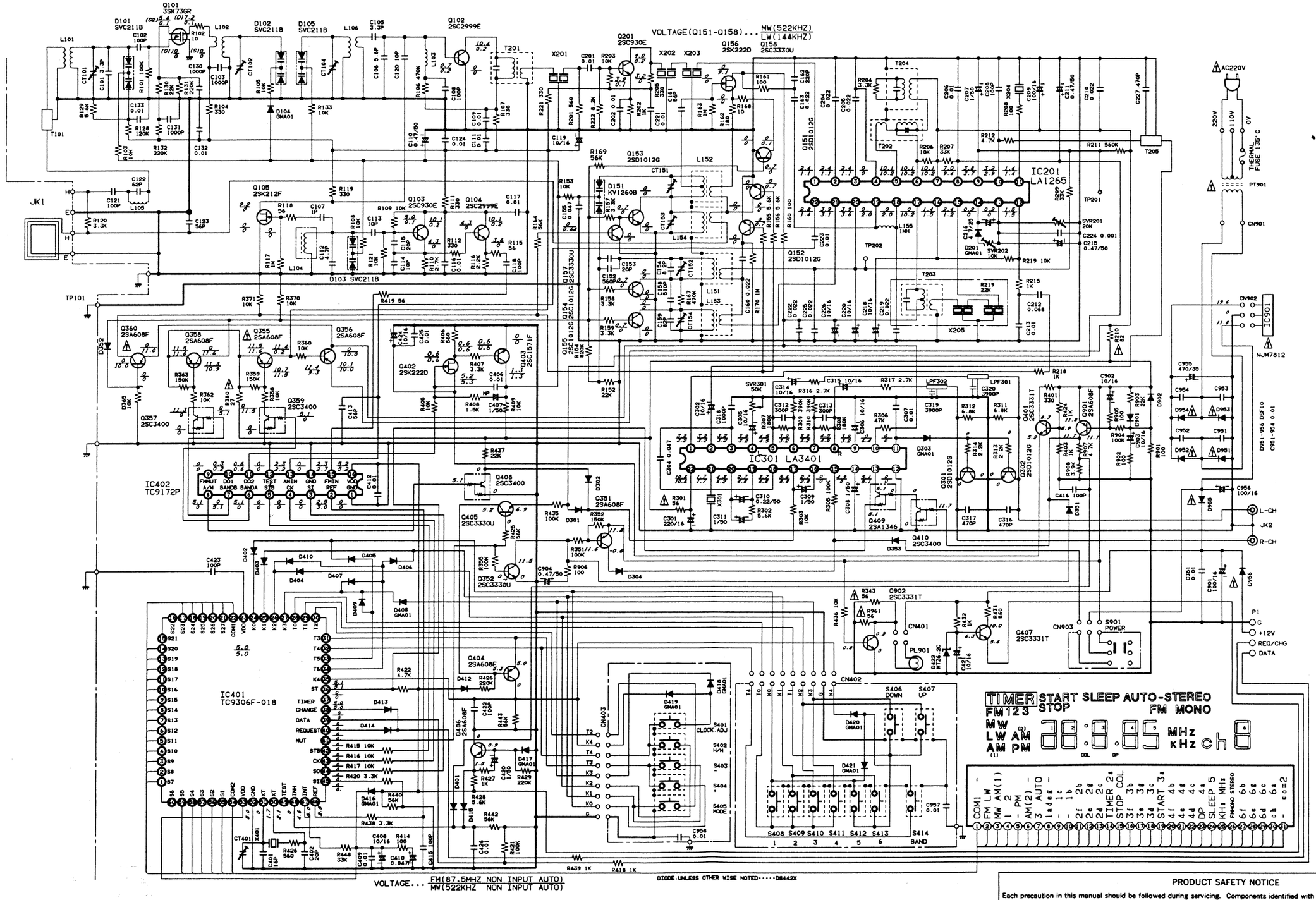
Each precaution in this manual should be followed during servicing. Components identified with the IEC symbol ⚠ in the parts list and the schematic diagram designate components in which safety can be of special significance. When replacing a component identified with ⚠, use only the replacement parts designated, or parts with the same ratings of resistance, wattage or voltage that are designated in the parts list in this manual.
Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returning the product to the customer.

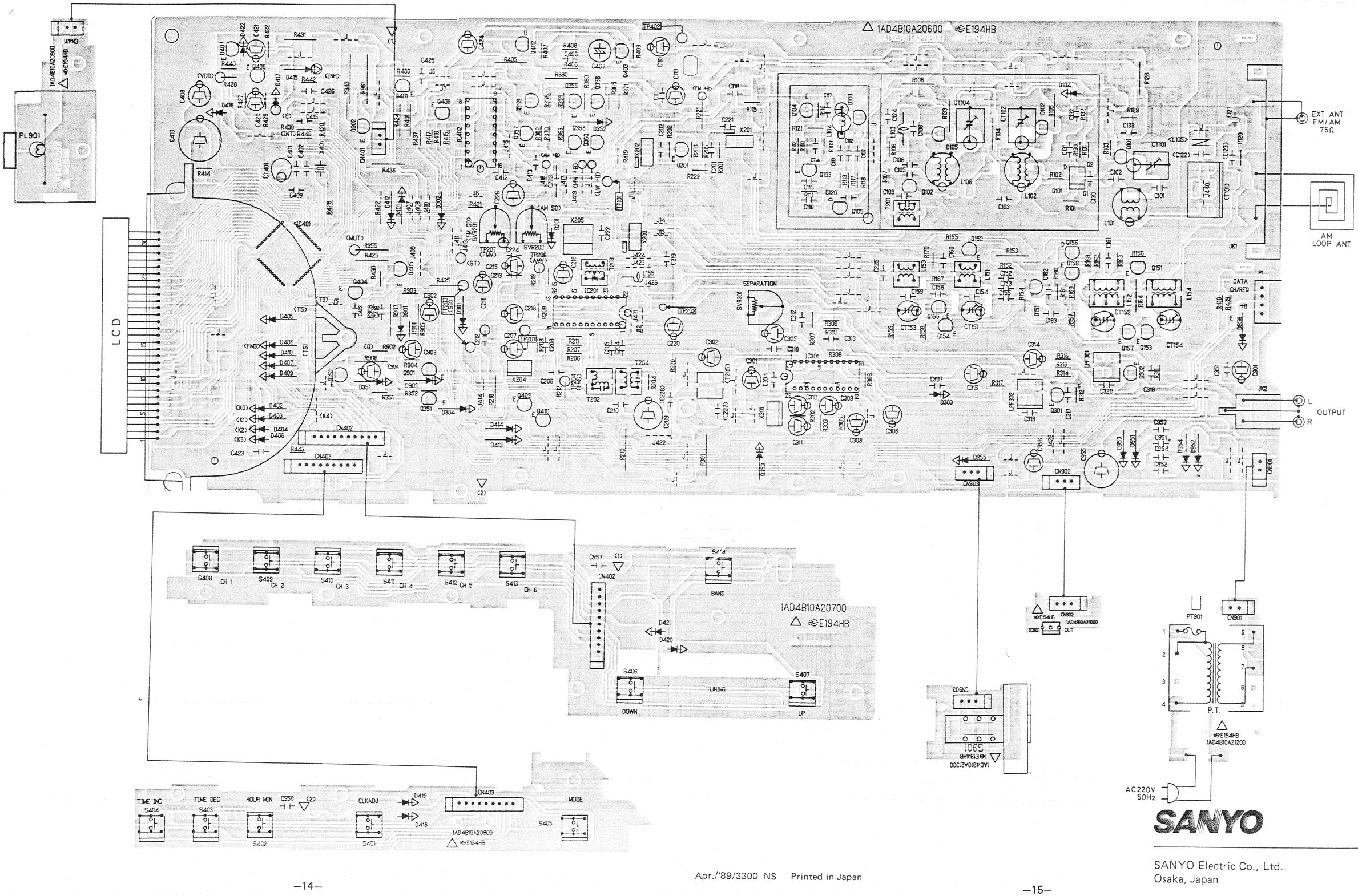


PRODUCT SAFETY NOTICE

Each precaution in this manual should be followed during servicing. Components identified with the IEC symbol ⚠ in the parts list and the schematic diagram designate components in which safety can be of special significance. When replacing a component identified with ⚠, use only the replacement parts designated, or parts with the same ratings of resistance, wattage or voltage that are designated in the parts list in this manual.

Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returning the product to the customer.

WIRING DIAGRAM



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